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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,757	10/30/2001	Tyler A. Lowrey	INTO-0013-US (P13341)	8684

7590

04/21/2003

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EXAMINER

SCHILLINGER, LAURA M

ART UNIT PAPER NUMBER

2813

DATE MAILED: 04/21/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/020,757

Applicant(s)

LOWREY, TYLER A.

Examiner

Laura M Schillinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 31-50 is/are pending in the application.
- 4a) Of the above claim(s) 37-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10,31,32 and 34-36 is/are rejected.
- 7) ☒ Claim(s) 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

This office action is in response to the Amendment A made in Paper No. 5, dated 3/19/03.

Election/Restrictions

Newly submitted claims 37-50 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 37-50 pertain to a separate and distinct species as follows:

Claims 37-50 pertain to a method to form phase change memory whereas phase change memory is not required in the originally elected claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 37-50 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-10 and 34-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Reinberg et al ('671).

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In reference to claim 1, Reinberg et al teaches a method comprising:

Forming a lower electrode (Col.8, lines: 35-50);

Covering the lower electrode with a protective layer (Col.8, lines: 25-40); and

Forming a phase change material over the lower electrode (Col.8, lines: 57-65).

In reference to claim 2, Reinberg et al teaches further comprising:

Defining a singulated opening (Col.7, lines: 40-50);

Forming a cup-shaped phase change material in the opening (Col.8, lines: 57-65);

Forming a thermally insulating material in the cup-shaped phase change material (Col.9, lines: 35-40).

In reference to claim 3, Reinberg et al teaches including defining the phase change material using a planarization process (Col.9, lines: 10-20).

In reference to claim 4, Reinberg et al teaches including defining the phase change material using a CMP technique (Col.9, lines: 10-20).

In reference to claim 5, Reinberg et al teaches including defining a spacer in the singulated opening (Col.8, lines: 20-30).

In reference to claim 6, Reinberg et al teaches including defining an electrode in the opening (Col.8, lines: 35-50).

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In reference to claim 7, Reinberg et al teaches including using the sidewall spacer to define the cup shape of the phase change material (Fig.8 (52)).

In reference to claim 8, Reinberg et al teaches including forming a base layer over a substrate and forming the lower electrode over the base layer (Fig.12 (40)).

In reference to claim 9, Reinberg et al teaches including sequentially forming the lower electrode and then the protective layer (Col.8, lines: 50-57).

In reference to claim 10, Reinberg et al teaches including etching the lower electrode and protective film using the same mask (Col.9, lines: 25-40).

In reference to claim 34, Reinberg teaches including forming the protective layer of an insulator (Col.9, lines: 30-35).

In reference to claim 35, Reinberg teaches including forming the protective layer of a material in the form of silicon nitride (Col.9, lines: 30-35).

In reference to claim 36, Reinberg teaches including forming the silicon nitride in the form of Si_3N_4 (Col.9, lines: 30-35).

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reinberg et al ('671) as applied to claims above, and further in view of Ovshinsky ('592).

In reference to claims 31 and 32, Reinberg teaches forming a lower electrode and a protective film. However, fails to explicitly teach forming both in the same deposition chamber.

Ovshinsky teaches implementing the same deposition chamber for sputtering an electrode material and then a silicon nitride film (Col.14, lines: 20-25).

It would have been obvious to one of ordinary skill in the art to modify Reinberg's teachings to include depositing both the electrode material and protective material in the same deposition chamber as claimed by the Applicant because Reinberg teaches to form such layers by PVD (Col.8, lines: 40-45) and Ovshinsky teaches his chamber may be implemented in PVD deposition processes (Col.12, lines: 25-30).

Response to Arguments

Applicant's arguments filed 3/19/03 have been fully considered but they are not persuasive. Applicant argues that Reinberg fails to teach Applicant's claimed limitation of a protective layer which covers the lower electrode. However, such an argument is not

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persuasive because as depicted in Fig.15, Reinberg teaches insulative layer (62) covers the top and sides of the lower electrode, insulative layer 42 covers the bottom portion of the lower electrode and further the electrode itself is made of a multilayer material with a lower layer of carbon which is protective in nature. Consequently, Reinberg does teach Applicant's claimed limitation.

Further, Applicant argues that the limitation of claim 10 is not taught by Reinberg. However this is not persuasive because Reinberg teaches simultaneously etching the electrode stack in Col.9, lines: 30-40.

Allowable Subject Matter

Claim 33 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Reinberg teaches forming a lower electrode and a protective film. However, fails to explicitly teach forming both in the same deposition chamber.

Ovshinsky teaches implementing the same deposition chamber for sputtering an electrode material and then a silicon nitride film (Col.14, lines: 20-25).

It would have been obvious to one of ordinary skill in the art to modify Reinberg's teachings to include depositing both the electrode material and protective material in the same deposition chamber as claimed by the Applicant as explained above. However, even in combination, Reinberg and Ovshinsky fail to teach nor suggest the

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claimed limitation of claim 33 which includes forming the electrode and protective layer in the same deposition chamber *without venting back to atmosphere*. Consequently, Applicant's claim contains allowable subject matter.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M Schillinger whose telephone number is (703) 308-6425. The examiner can normally be reached on M-T, R-F 7:00-5:00.

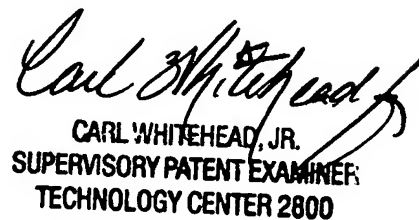
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead, Jr. can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

LMS
April 14, 2003


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800